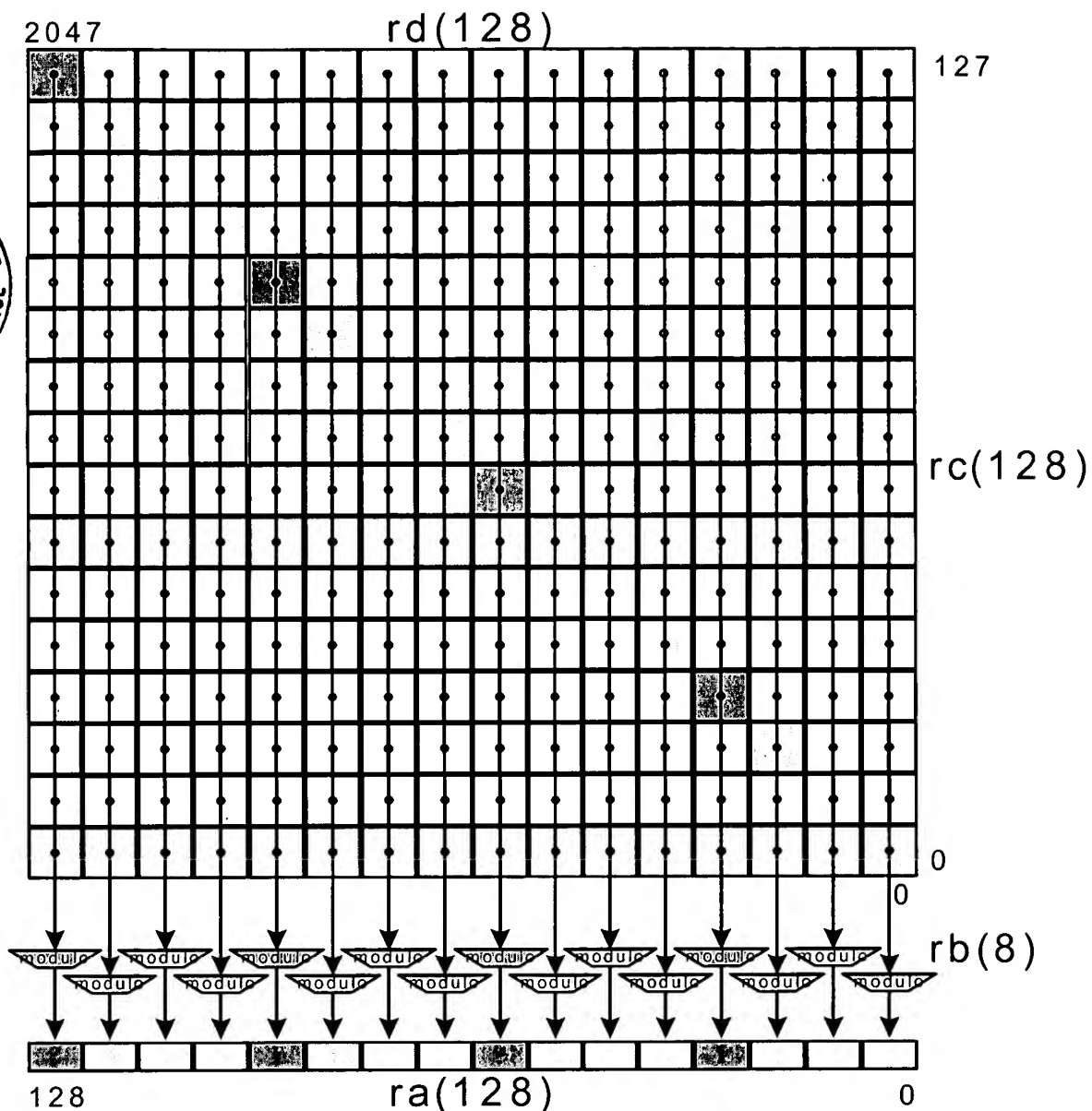## Definition

```
def GroupTernary(op,size,rd,rc,rb,ra) as
      d ← RegRead(rd, 128)
      c ← RegRead(rc, 128)
      b ← RegRead(rb, 128)
      case op of
            G.MUX:
                  a ← (c and d) or (b and not d)
      endcase
      RegWrite(ra, 128, a)
enddef
```

Exceptions

Fig. 31E
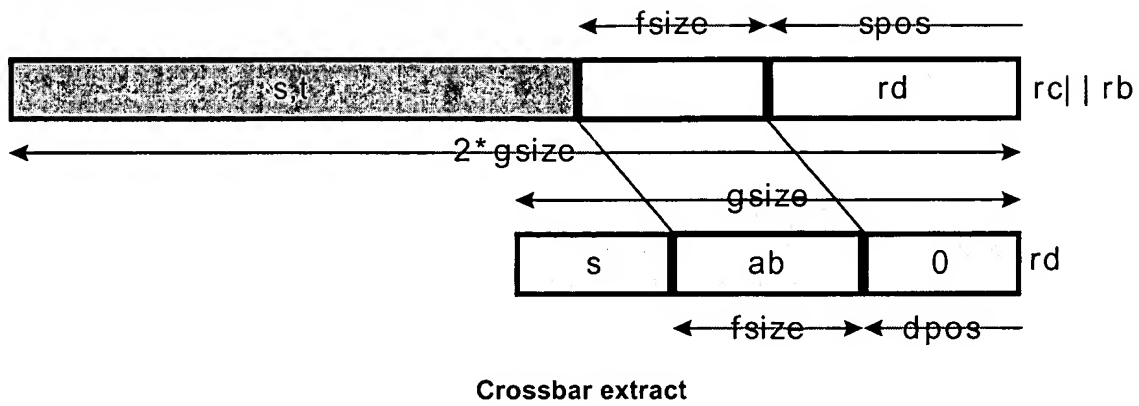
Ensemble multiply Galois field bytes
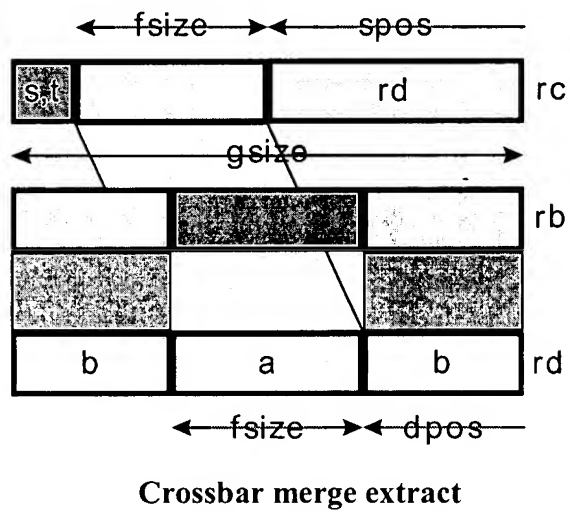
Fig. 42D
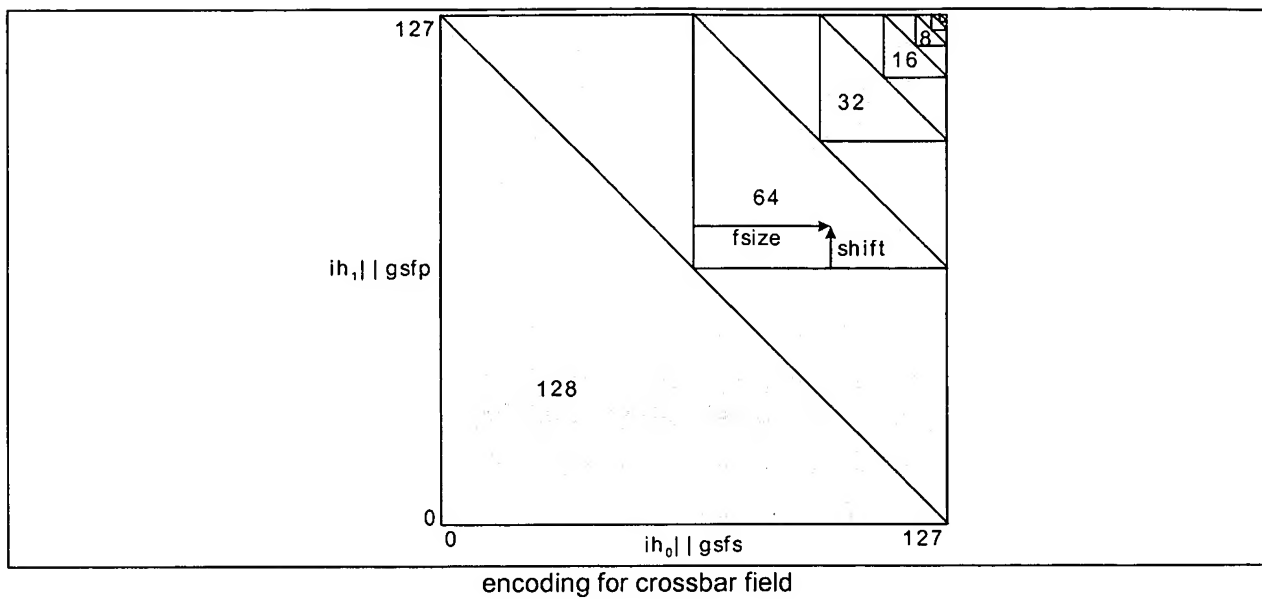
Crossbar extract

Fig. 44C

Crossbar merge extract

Fig. 44D

encoding for crossbar field

Fig. 45D

crossbar deposit

Fig. 45E

crossbar withdraw
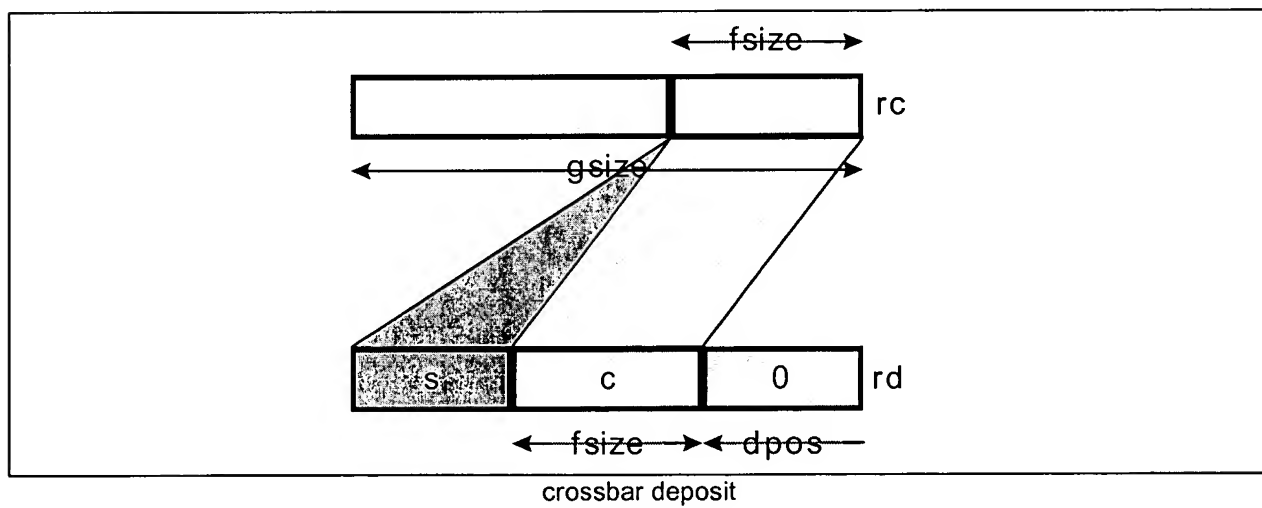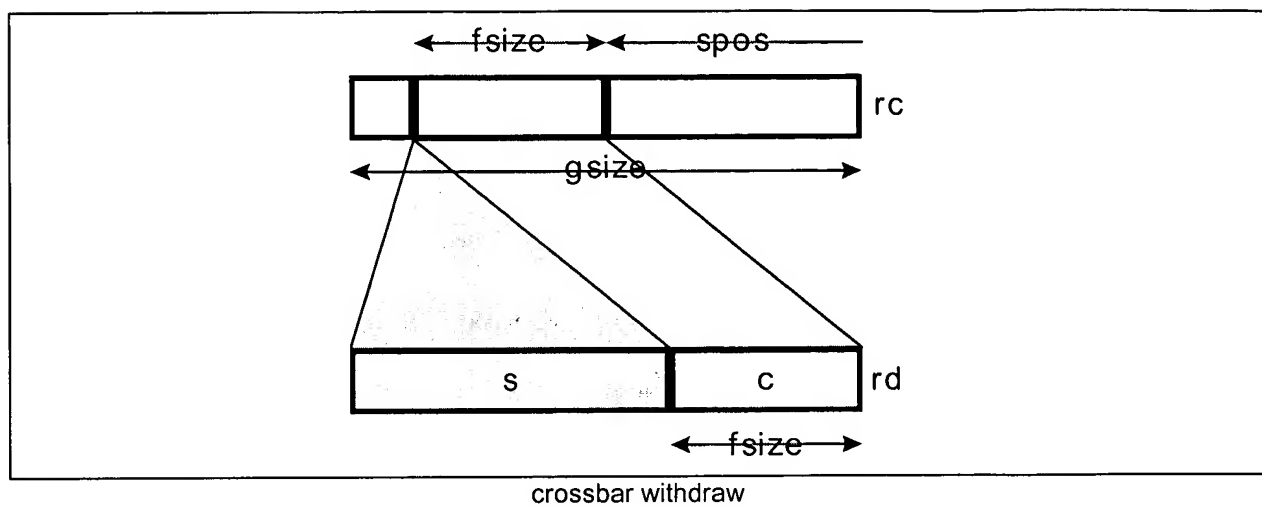
Fig. 45F

Operation codes

X.DEPOSIT.M.2	Crossbar deposit merge pecks
X.DEPOSIT.M.4	Crossbar deposit merge nibbles
X.DEPOSIT.M.8	Crossbar deposit merge bytes
X.DEPOSIT.M.16	Crossbar deposit merge doublets
X.DEPOSIT.M.32	Crossbar deposit merge quadlets
X.DEPOSIT.M.64	Crossbar deposit merge octlets
X.DEPOSIT.M.128	Crossbar deposit merge hexlet

Fig 45G

Format

X.op.gsize rd@rc,isize,ishift

- rd=xopgsize(rd,rc,isize,ishift)

31		26	25	24	23		18	17		12	11		6	5		0
op			**ih**		**rd**			**rc**			**gsfp**			**gsfs**		
6			2		6			6			6			6		
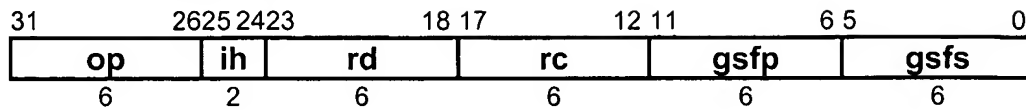
assert isize+ishift $\leq$ gsize
assert isize$\geq$1
$ih_0 \parallel gsfs \leftarrow 128-gsize+isize-1$
$ih_1 \parallel gsfp \leftarrow 128-gsize+ishift$

Fig 45H

Definition

```
def CrossbarFieldInplace(op,rd,rc,gsfp,gsfs) as
      c ← RegRead(rc, 128)
      d ← RegRead(rd, 128)
      case ((op₁ || gsfp) and (op₀ || gsfs)) of
            0..63:
                  gsize ← 128
            64..95:
                  gsize ← 64
            96..111:
                  gsize ← 32
            112..119:
                  gsize ← 16
            120..123:
                  gsize ← 8
            124..125:
                  gsize ← 4
            126:
                  gsize ← 2
            127:
                  raise ReservedInstruction
      endcase
      ishift ← (op₁ || gsfp) and (gsize-1)
      isize ← ((op₀ || gsfs) and (gsize-1))+1
      if (ishift+isize>gsize)
            raise ReservedInstruction
      endif
      for i ← 0 to 128-gsize by gsize
            a_{i+gsize-1..i} ← d_{i+gsize-1..i+isize+ishift} || c_{i+isize-1..i} || d_{i+ishift-1..i}
      endfor
      RegWrite(rd, 128, a)
enddef
```
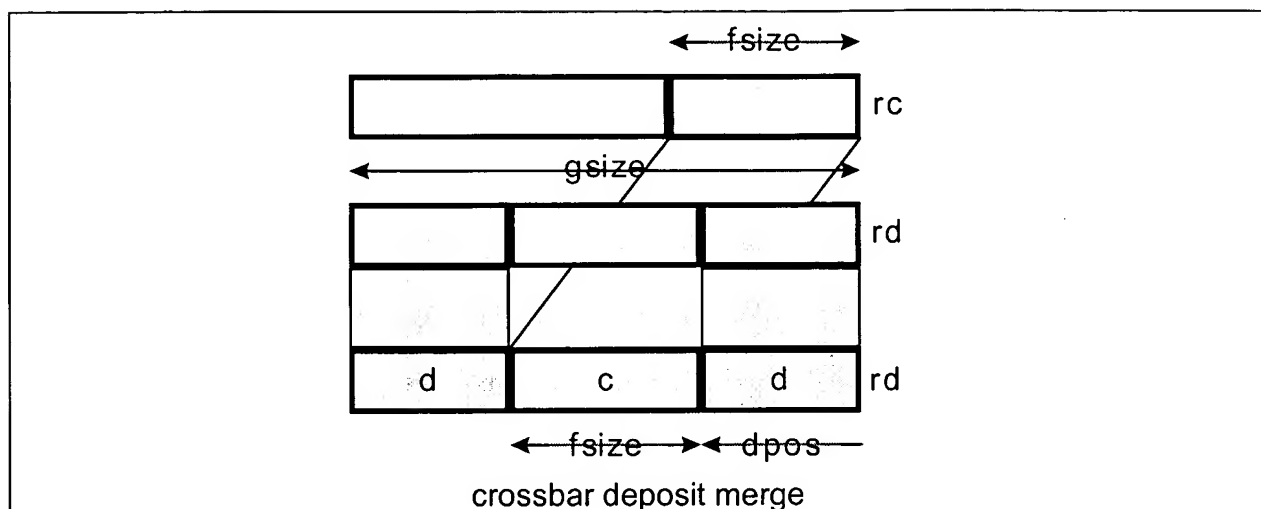
Exceptions

Reserved instruction

Fig 45I

crossbar deposit merge

Fig 45J